(12) INTERNATIONAL APPLICATION PUBLISHED PURSUANT TO THE INTERNATIONAL PATENT COOPERATION TREATY (PCT)

- (19) World Intellectual Property Organization International Bureau
- (43) International publication date: number:

2005) 1

(10) International publication

Sept. 29, 2005 (29.09.2005)

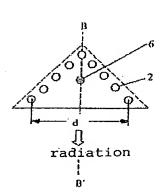
PCT

WO 2005/091438 A1

- (51) International Patent Classification⁷: H01Q 23/00, 13/02, 13/18, 21/00
- (21) International File No.: PCT/EP2005/003303
- (22) International application date: March 16, 2005 (16.03.2005)
- (25) Language of submission: German
- (26) Language of publication: German
- (30) Priority data: 10 2004 014 018.9 March 19, 2004 (19.03.2004) DE
- 71) Inventor (for all contractual states except the US): Forschungsverbund Berlin e.V. [DE/DE]; Rudower Chaussee 17, 12489 Berlin (DE).
- (72) Inventor; and
- (75) Inventor/Applicant (for the US only):
 HEINRICH, Wolfgang [DE/DE]; Am
 Waldhaus 26 A, 14129 Berlin (DE);
 TALUKDER, Prodyut [BD/DE]; HugoHeimann-Str. 14, 12353 Berlin (DE).

- (74) Attorneys: HENGELHAUPT, Jürgen, D. etc.; Gulde Hengelhaupt Ziebig & Schneider, Wallstr. 58/59, 10179 Berlin (DE).
- (81) Contractual states (unless otherwise specified, for every available type of national intellectual property right):
 AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- 84) Contractual states (unless otherwise specified, for every available type of national intellectual property right):
 ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL,

[Continued on next page]



(54) Title: MICROWAVE ANTENNA FOR FLIP-CHIP SEMICONDUCTOR MODULES

(57) The invention relates to a microwave antenna for flip-chip semiconductor modules, comprising two semiconductor substrates which are metallized on the surface thereof. Patch antennas, i.e. metallized flat areas which are insulated from the rest of the circuit on an outer surface of a module with a supply line to the circuit, are already known per se. They result in vertical radiation at a relatively large angle. According to the invention, a closed group of bumps are arranged in such a way that the distance of the bumps (2) to each other is less than the half wavelength (λ /2) of the microsignal which is to be radiated or received and an open radiation slot arises in at least one pair of side walls (3,4) of the semiconductor substrates (a, b) and a bump (6), which is connected to the circuit of the semiconductor module, is arranged between the bumps (2) and the radiation slot, enabling the microwave antenna to be excited.

PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international research report
- prior to the expiry of the deadline for modification of the claims; publication will be repeated if modifications arise

For explanation of the two-letter codes and the other abbreviations, please consult the explanations ("Guidance Notes on Codes and Abbreviations") at the beginning of each regular edition of the PCT Gazette.